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December 19,2002

Via Hand Delivery

Ms. Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, DC 20554

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Re: ***Ex Parte Presentation:***
IB Docket No. 01-185;
File No. SAT-ASG-20010302-00017 et al.;
File No. SES-ASG-20010116-00099 et al.

Dear Ms. Dortch:

Inmarsat Ventures plc ("Inmarsat") has recently obtained a copy of a report prepared by COMTEK Associates, Inc. for Industry Canada, dated November 5, 2002, and entitled "Use of Mobile Satellite Spectrum to Provide Complementary Terrestrial Mobile Service to Improve Satellite Coverage" (the "COMTEK Report"). While the COMTEK report does not appear in the record of this proceeding, Inmarsat believes that it might nevertheless have come to the attention of Commission staff.

This document provides Inmarsat's preliminary assessment of the COMTEK Report. The COMTEK Report is 153 pages long and is the result of an extensive study commenced in January 2002. A complete assessment of this technical analysis, which has been ten months in the making, and raises many new issues not previously briefed in this proceeding, would require a number of weeks of analysis. Inmarsat believes that before the Commission could rely on the COMTEK Report, that analysis would have to be placed on public notice to provide interested parties a full and complete opportunity to respond. Recognizing the Commission's desire to take action on the ATC proceeding by the end of 2002, Inmarsat is providing this preliminary assessment, based on the very short period of time that Inmarsat has had the report. To the extent the schedule of this proceeding permits, Inmarsat reserves the right to submit a further and more complete analysis.

The COMTEK Report addresses a wide range of issues. For some of these issues (e.g., aircraft flight paths affected by ATC interference) extensive analysis has been performed and the results comprehensively presented. In some other areas (e.g., whether real-world ATC systems could ever operate without requiring additional L-band spectrum) the issues have not been rigorously addressed by COMTEK. Furthermore, the COMTEK Report makes certain

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subjective assessments and assumptions that are not supported at all, but which significantly impact the overall conclusions of the report. Examples of these are the assumed overload level of the Inmarsat mobile earth terminal receivers and the impact on Inmarsat of the loss of spectrum caused by ATC interference. For these reasons, we believe the conclusions of the COMTEK Report need to be tempered with other information provided previously in this proceeding by Inmarsat.

Nevertheless, the COMTEK Report validates many aspects of the ATC interference assessment provided by Inmarsat in this proceeding. Among other things, COMTEK rejects the MSV argument that signal "blockage" in urban environments will mitigate the ATC interference toward the Inmarsat spacecraft (COMTEK Report at 47-48), and confirms that ATC base stations will overload nearby MSS mobile earth terminals (COMTEK Report at 131).

While Inmarsat has not fully examined COMTEK's analysis of the uplink interference problem, Inmarsat is concerned about some very important underlying assumptions in the COMTEK Report, discussed below, some of which are wrong as a factual matter.

Moreover, COMTEK does not even begin to consider how effective limits on ATC operations could be imposed, by appropriate and enforceable regulatory rules and conditions, and in a manner that would ensure that ATC facilities across the entire US are actually built, maintained and operated in accordance with the assumed parameters contained in COMTEK's analysis.

1. Inmarsat Does Not Plan An ATC System for Itself.

COMTEK assumes that Inmarsat itself will need to develop an ATC capability in order to continue to have a profitable business, and that Inmarsat will be one of four separate MSS systems providing ATC in the L-band (COMTEK Report at 43-44). COMTEK has disregarded Inmarsat's repeated record statements that Inmarsat does not need ATC in order to continue to provide commercial MSS service. Indeed, COMTEK does not recognize that Inmarsat's business case never has been based on competing with PCS or cellular phone systems. Nor does COMTEK indicate how or why it thinks that it is realistic to expect the US market to support the introduction of four L-band ATC providers in CMRS markets that already face stiff competition by AT&T, Cingular, Sprint, T-Mobile, Verizon Wireless, Qwest Wireless, Nextel and ALLTEL, among many other wireless providers.

2. ATC Consumes Additional Spectrum.

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Because of the global shortage of L-band MSS spectrum, this is a very important shortcoming in the scope of the COMTEK Report, and it calls into question the validity of COMTEK's conclusions about the impact of ATC interference into Inmarsat spacecraft.

3. Interference into Inmarsat Spacecraft.

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COMTEK is wrong on all three assumptions.

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[1] "MSV is Unable to Operate **ATC** Without Using Additional Spectrum Beyond That Used for Its MSS System," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al***. (filed May 21, 2002)

[2] ***Exparte*** presentation, Iridium Satellite LLC, IB Docket No. 01-185, December 3, 2002.

and various other users. Inmarsat anticipates that its services will continue to grow, particularly as a result of the recent opening of the U.S. market to Inmarsat service.

Today's Inmarsat-3 satellites use more than 10 MHz in each direction and are congested both in power and spectrum. Spectrum efficiency will increase with the next-generation Inmarsat-4 spacecraft, but so will the traffic carried by the system, particularly with the introduction of the bandwidth-intensive, new, high-speed data services that will be available on Inmarsat-4. Inmarsat therefore estimates that it will need more spectrum in the future than it uses today. In fact, since the available power on new MSS satellites is much greater than for the current generation (I3), it is more likely that Inmarsat's operations we will be spectrum limited in the future rather than power limited. Therefore COMTEK's assertion that "the projected amount of available L-band spectrum in connection with the geomobile systems such as INMARSAT-4 is so large that is much beyond the power capability of these satellites" (COMTEK Report at 137) is neither supported by Inmarsat's experience nor by its projections.

COMTEK also wrongly assumes that Inmarsat would be unconstrained outside North America in the rest of the spectrum (in the 3x7 MHz in each direction that COMTEK assumes will be available for use by its assumed three other North American MSS/ATC operators). This ignores the impact of the use of the L-band by many other L-band MSS systems operating in the rest of the world, which constrains Inmarsat's access to the L-band outside North America.

As to the continued relevance of the 6% criterion for satellite-satellite coordination, that criterion is commonly used in frequency coordination, including L-band satellite network coordination. Inmarsat still bases its reuse constraints with other operators on C/I criteria based on 6% $\Delta T/T$, although exceptions are sometimes made on a case-by-case basis to enable access to spectrum and orbit for as many satellite networks as possible.

The interference margin in satellite systems is limited. Normally, a 1 dB aggregate allowance is made for intersystem interference from all other systems. This corresponds to an aggregate $\Delta T/T$ level of about 25%. It is obvious that as the number of interferers increases, it becomes more important (not less important as implied by COMTEK) to ensure that each interferer is limited to a reasonable interference level. Inmarsat has to account in its link budgets for interference from all other L-band satellite networks — there are currently over 20 satellites operating at L-band and the number has been growing over the last few years. Thus, with increasing use of the spectrum by satellite systems, the interference margin that could be made available for other sources of interference (such as ATC) is less. Even with COMTEK's predicted interference amounting to a $\Delta T/T$ level of 13.7% (which Inmarsat contends is not accurate and significantly under-estimates the likely interference level), the proportion of the overall aggregate interference margin consumed by ATC would be more than 50%, which is totally unacceptable and would impose significant operational and capacity constraints on Inmarsat.

Moreover, COMTEK's assessment of the ATC interference effect into the Inmarsat-4 spacecraft does not take into account the actual antenna performance parameters of

the Inmarsat-4 spacecraft now well under construction. COMTEK asserts that Inmarsat has assumed a "blanket 20 dB sidelobe isolation" (COMTEK Report at 78). This is not correct. Inmarsat has described on a number of occasions the expected roll-off of its sidelobes. For example, page 8 of Inmarsat's September 12, 2002 ex parte presentation' shows an example an Inmarsat-4 beam over the Atlantic, with the –20 dB sidelobes over the East coast, and –25 dB and –30 dB sidelobes over other parts on the US. In contrast, COMTEK depicts a simplistic elemental beam with better sidelobes than Inmarsat's actual beam (COMTEK Report at 81). Thus, COMTEKs analysis does not account for the real-world parameters of the Inmarsat-4 system.

The COMTEK Report calculates a $\Delta T/T$ of 13.7% (which Inmarsat contends is not accurate and which significantly under-estimates the likely interference level) generated by ATC into the Inmarsat spacecraft, but also wrongly concludes that this is acceptable based on an overall link margin analysis. COMTEK correctly calculates that 13.7% $\Delta T/T$ corresponds to 0.6 dB degradation of thermal noise but then goes on to conclude that this corresponds to 0.23 dB degradation in total link margin. The calculation of this latter figure is not given. This figure depends on the size of the other interference contributions in the link budget, and COMTEK's estimate of this is too high. All beams in a multi-beam MSS system will not suffer the worst-case levels of inter-beam re-use interference and in practice a typical MSS return link budget in such a system is still dominated by uplink thermal noise. Therefore the degradation of the total link margin is closer to the degradation in uplink thermal noise than to the figure suggested by COMTEK.

Thus, there is no basis for COMTEK's conclusion that an expected 13.7% thermal noise level degradation to Inmarsat caused by a "fully-grown" ATC system "should be acceptable" to Inmarsat (COMTEK Report at 137). It is not. That level of interference from ATC would constrain the capacity of the Inmarsat system and constitute harmful interference.

The third major problem with COMTEK's uplink interference assessment concerns the assumption that the MSV mobile transmitters will operate at full power only when inside buildings (COMTEK Report at 53-62), and that the moment they are outside of a building they must be operating with one tenth of their maximum power. COMTEK draws this conclusion based on the logic that a user in a building at the edge of a cell must be able to close his link at full power, and therefore the moment he walks outside his power will reduce (by automatic power control) to a value 10 dB less. Inmarsat does not believe this situation can be relied upon. In an urban or suburban environment it seems quite feasible that the user could walk outside, yet still be blocked from his base station by the full mass of the building, and therefore still require full power to close his link. In this case, being outside and operating at full power, he will now contribute significantly to the uplink interference in the Inmarsat satellite

[3] *Exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed September 12,2002); ***see*** *also* "Inmarsat's Reply to the Further Technical Analysis' of Mobile Satellite Ventures, dated July 29,2002," *exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed September 9,2002).

receiver. This dubious assumption on the part of COMTEK significantly distorts COMTEK's overall conclusion on the magnitude of the uplink interference to Inmarsat.

4. Interference into Inmarsat Mobile Earth Terminals.

COMTEK concludes that ATC presents an interference threat into Inmarsat mobile terminals. In its analysis, COMTEK uses MSV's assumed overload levels (which Inmarsat believes are inaccurate and not typical), but recommends that MSV provide testing reports to validate those values (COMTEK Report at 90). To be valid, any such testing, of course, would need to cover the 21 different models of Inmarsat terminals being manufactured by 96 different manufacturers. All of COMTEK's conclusions concerning the vulnerability of aircraft flight paths are directly dependent on this one key assumption about the Inmarsat receiver overload level.

COMTEK further makes certain important assumptions about ATC design and operation, which either are not in MSV's system design, or remain a matter of dispute in this proceeding. Namely, COMTEK assumes that (i) there will be only three ATC carriers per base station, (ii) signal blockage of the base station signal will occur, even in the case of interference into Inmarsat aero terminals, (iii) MSV will actually be able to deploy and maintain the performance of its proposed "super-performing'' base station antennas with the extraordinary roll-off at positive elevation angles, (iv) MSV will deploy a frequency hopping GSM design that will cause only intermittent interference, and (v) there are effective ways to constrain the deployment of ATC base stations to reliably prevent jamming of aircraft communications. COMTEK does not address the fact that some ATC base stations will likely be located higher than the flight paths near some airports, and that even assuming the "super-performing" MSV antennas really work, Inmarsat receivers on board airplanes still will fly through the main beam of the base station's signal.

In any event, even putting those problems aside, COMTEK's analysis supports what Inmarsat has asserted all along: emissions from ATC base station will produce exclusion zones where **MSS** mobile terminals will not operate properly. In COMTEK's own words: *"In the case of front-end loading of MSS terminals operating in-band, the loading can be excessive, pushing the terminal into desensitisation region. Based on our estimate of the severity of the interference, we believe a MSS terminal in close proximity to an ATC base station should be a cause for concern, unless there is specific front-end filtering provided by the design of the terminal."* (COMTEK Report at 131).

Thus, the COMTEK analysis confirms Inmarsat's conclusion that ATC base station deployment would create "Swiss cheese" holes in Inmarsat's service area.[4]

[4] "Economic Impact of Terrestrial L-Band Services on Inmarsat and Its Users," *exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed November 27, 2002).

COMTEK implies that adding specific front-end filtering is not a desirable solution, but does not address the sheer impossibility of retrofitting the 250,000 Inmarsat mobile earth terminals already in operation.[5]

5. MSV-Self Interference.

COMTEK does not analyze the extent to which MSV's deployment of ATC would cause intra-system interference to MSV's satellite operations. This issue is glossed over in Section 7.3 of the COMTEK Report. COMTEK has referred to the MSV stated requirement of 10 dB isolation, without examining whether the acceptance of such a high level of intra-system interference, due to ATC interference alone, is feasible (COMTEK Report at 78). COMTEK has also based its derivation of the spectrum (sub-bands) available for ATC use in different parts of the satellite beams on ideal assumptions.

This issue is critical because it represents another aspect of the interference scenario that adversely impacts Inmarsat. As Inmarsat has demonstrated, self-interference from ATC causes MSV to consume more L-band spectrum than it otherwise needs.[6] That spectrum would not be available for Inmarsat to use for the expanding demand for MSS service. This self-interference problem is one of the many ways that ATC constrains the capacity of the Inmarsat system.

6. Monitoring and Control of Interference.

COMTEK does not assess how ATC interference into the Inmarsat spacecraft could be monitored and controlled. As Inmarsat has previously explained, this is a very important issue that requires a practical solution before ATC could be authorized.' The issues that Inmarsat has identified with monitoring and controlling ATC interference into the Inmarsat spacecraft* become even more complex in the case assumed by COMTEK where four separate ATC systems could operate in the L-band.

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[5] *Id*

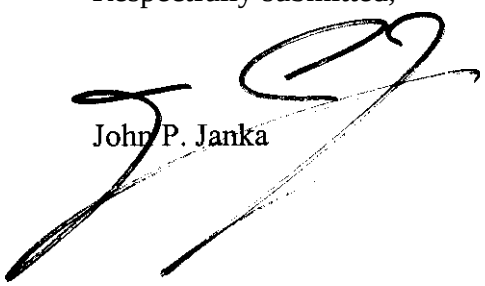
[6] "MSV is Unable to Operate ATC Without Using Additional Spectrum Beyond That Used for Its **MSS** System," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al***. (filed May 21,2002).

[7] "Inmarsat Response to MSV **Ex** Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,"' ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed May 15,2002).

[8] "Economic Impact of Terrestrial L-Band Services on Inmarsat and Its Users," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed November 27, 2002); Letter from Inmarsat to Chief, Office of Engineering and Technology regarding terrestrial monitoring capabilities, dated November 26,2002, *ex parte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al***. (filed November 27,2002).

An original and five copies are enclosed.

Respectfully submitted,



John P. Janka

Enclosures

cc:

Bryan Tramont
John Branscome
Paul Margie
Sam Feder
Barry Ohlson
Ed Thomas
Bruce Franca
Rick Engelman
Chris Murphy
Breck Blalock
Ron Repasi
Paul Locke
Trey Hanbury

Inmarsat Technical Analvses on ATC

1. *Comments oflnmarsat Venturesplc,* IB Docket No. 01-185 (filed October 19, 2001), and *Technical Annex* thereto

2. *Reply Comments oflnmarsat Venturesplc,* IB Docket No. 01-185 (filed November 13, 2001), and *Supplemental Technical Annex* thereto

3. *Exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed February 26,2002)

4. *Further Comments oflnmarsat Venturesplc,* IB Docket No. 01-185 (filed March 22,2002)

5. "Quantification of Harmful Co-Channel L-Band Uplink Interference into Inmarsat-4 From MSV ATC Uses, Versus MSV Mobile Earth Terminal Uses,'' *exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed May 10,2002)

6. "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,"' *exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et*** *al.* (filed May 15,2002)

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8. "Inmarsat's Reply to the 'Further Technical Analysis' of Mobile Satellite Ventures, dated July 29,2002," *exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed September 9,2002)

9. *Exparte* presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed September 12,2002)

10 *Exparte* presentation of Inmarsat to the Office of Engineering and Technology, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 *et al.* (filed November 6,2002)

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[2] ***Exparte*** presentation, Iridium Satellite LLC, IB Docket No. 01-185, December 3,2002.

and various other users. Inmarsat anticipates that its services will continue to grow, particularly as a result of the recent opening of the U.S. market to Inmarsat service.

Today's Inmarsat-3 satellites use more than 10MHz in each direction and are congested both in power and spectrum. Spectrum efficiency will increase with the next-generation Inmarsat-4 spacecraft, but so will the traffic carried by the system, particularly with the introduction of the bandwidth-intensive, new, high-speed data services that will be available on Inmarsat-4. Inmarsat therefore estimates that it will need more spectrum in the future than it uses today. In fact, since the available power on new MSS satellites is much greater than for the current generation (I3), it is more likely that Inmarsat's operations we will be spectrum limited in the future rather than power limited. Therefore COMTEK's assertion that "the projected amount of available L-band spectrum in connection with the geomobile systems such as INMARSAT-4 is so large that is much beyond the power capability of these satellites" (COMTEK Report at 137) is neither supported by Inmarsat's experience nor by its projections.

COMTEK also wrongly assumes that Inmarsat would be unconstrained outside North America in the rest of the spectrum (in the 3x7 MHz in each direction that COMTEK assumes will be available for use by its assumed three other North American MSS/ATC operators). This ignores the impact of the use of the L-band by many other L-band MSS systems operating in the rest of the world, which constrains Inmarsat's access to the L-band outside North America.

As to the continued relevance of the *6%* criterion for satellite-satellite coordination, that criterion is commonly used in frequency coordination, including L-band satellite network coordination. Inmarsat still bases its reuse constraints with other operators on C/I criteria based on *6%* $\Delta T/T$, although exceptions are sometimes made on a case-by-case basis to enable access to spectrum and orbit for as many satellite networks as possible.

The interference margin in satellite systems is limited. Normally, a 1dB aggregate allowance is made for intersystem interference from all other systems. This corresponds to an aggregate $\Delta T/T$ level of about 25%. It is obvious that **as** the number of interferers increases, it becomes more important (not less important as implied by COMTEK) to ensure that each interferer is limited to a reasonable interference level. Inmarsat has to account in its link budgets for interference from all other L-band satellite networks--- there are currently over 20 satellites operating at L-band and the number has been growing over the last few years. Thus, with increasing use of the spectrum by satellite systems, the interference margin that could be made available for other sources of interference (such as ATC) is less. Even with COMTEKs predicted interference amounting to a $\Delta T/T$ level of 13.7% (which Inmarsat contends is not accurate and significantly under-estimates the likely interference level), the proportion of the overall aggregate interference margin consumed by ATC would be more than 50%, which is totally unacceptable and would impose significant operational and capacity constraints on Inmarsat.

Moreover, COMTEK's assessment of the ATC interference effect into the Inmarsat-4 spacecraft does not take into account the actual antenna performance parameters of

the Inmarsat-4 spacecraft now well under construction. COMTEK asserts that Inmarsat has assumed a "blanket 20 dB sidelobe isolation" (COMTEK Report at 78). This is not correct. Inmarsat has described on a number of occasions the expected roll-off of its sidelohes. For example, page 8 of Inmarsat's September 12,2002 ex parte presentation[3] shows an example an Inmarsat-4 beam over the Atlantic, with the –20 dB sidelobes over the East coast, and –25 dB and –30 dB sidelobes over other parts on the US. In contrast, COMTEK depicts a simplistic elemental beam with better sidelobes than Inmarsat's actual beam (COMTEK Report at 81). Thus, COMTEK's analysis does not account for the real-world parameters of the Inmarsat-4 system.

The COMTEK Report calculates a $\Delta T/T$ of 13.7% (which Inmarsat contends is not accurate and which significantly under-estimates the likely interference level) generated by ATC into the Inmarsat spacecraft, but also wrongly concludes that this is acceptable based on an overall link margin analysis. COMTEK correctly calculates that 13.7% $\Delta T/T$ corresponds to 0.6 dB degradation of thermal noise but then goes on to conclude that this corresponds to 0.23 dB degradation in total link margin. The calculation of this latter figure is not given. This figure depends on the size of the other interference contributions in the link budget, and COMTEK's estimate of this is too high. All beams in a multi-beam MSS system will not suffer the worst-case levels of inter-beam re-use interference and in practice a typical MSS return link budget in such a system is still dominated by uplink thermal noise. Therefore the degradation of the total link margin is closer to the degradation in uplink thermal noise than to the figure suggested by COMTEK.

Thus, there is no basis for COMTEK's conclusion that an expected 13.7% thermal noise level degradation to Inmarsat caused by a "fully-grown" ATC system "should be acceptable" to Inmarsat (COMTEK Report at 137). It is not. That level of interference from ATC would constrain the capacity of the Inmarsat system and constitute harmful interference.

The third major problem with COMTEK's uplink interference assessment concerns the assumption that the MSV mobile transmitters will operate at full power only when inside buildings (COMTEK Report at 53-62), and that the moment they are outside of a building they must be operating with one tenth of their maximum power. COMTEK draws this conclusion based on the logic that a user in a building at the edge of a cell must be able to close his link at full power, and therefore the moment he walks outside his power will reduce (by automatic power control) to a value 10 dB less. Inmarsat does not believe this situation can be relied upon. In an urban or suburban environment it seems quite feasible that the user could walk outside, yet still be blocked from his base station by the full mass of the building, and therefore still require full power to close his link. In this case, being outside and operating at full power, he will now contribute significantly to the uplink interference in the Inmarsat satellite

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[3] ***Exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed September 12,2002);***see also*** "Inmarsat's Reply to the Further Technical Analysis' of Mobile Satellite Ventures, dated **July** 29,2002," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017***et al.*** (filed September 9,2002).

receiver. This dubious assumption on the part of COMTEK significantly distorts COMTEKs overall conclusion on the magnitude of the uplink interference to Inmarsat.

4. Interference into Inmarsat Mobile **Earth** Terminals.

COMTEK concludes that ATC presents an interference threat into Inmarsat mobile terminals. In its analysis, COMTEK uses MSV's assumed overload levels (which Inmarsat believes are inaccurate and not typical), but recommends that MSV provide testing reports to validate those values (COMTEK Report at 90). To be valid, any such testing, of course, would need to cover the 21 different models of Inmarsat terminals being manufactured by **96** different manufacturers. All of COMTEK's conclusions concerning the vulnerability of aircraft flight paths are directly dependent on this one key assumption about the Inmarsat receiver overload level.

COMTEK further makes certain important assumptions about ATC design and operation, which either are not in MSV's system design, or remain a matter of dispute in this proceeding. Namely, COMTEK assumes that (i) there will be only three ATC carriers per base station, (ii) signal blockage of the base station signal will occur, even in the case of interference into Inmarsat aero terminals, (iii) MSV will actually be able to deploy and maintain the performance of its proposed "super-performing" base station antennas with the extraordinary roll-off at positive elevation angles, (iv) MSV will deploy a frequency hopping GSM design that will cause only intermittent interference, and (v) there are effective ways to constrain the deployment of ATC base stations to reliably prevent jamming of aircraft communications. COMTEK does not address the fact that some ATC base stations will likely be located higher than the flight paths near some airports, and that even assuming the "super-performing" MSV antennas really work, Inmarsat receivers on board airplanes still will fly through the main beam of the base station's signal.

In any event, even putting those problems aside, COMTEK's analysis supports what Inmarsat has asserted all along: emissions from ATC base station will produce exclusion zones where MSS mobile terminals will not operate properly. In COMTEKs own words: *"In the case offront-end loading of MSS terminals operating in-band. the loading can be excessive, pushing the terminal into desensitisation region. Based on our estimate of the severity of the interference, we believe a MSS terminal in close proximity to an ATC base station should be a causefor concern, unless there is specific front-endfiltering provided by the design of the terminal."* (COMTEK Report at 131).

Thus, the COMTEK analysis confirms Inmarsat's conclusion that ATC base station deployment would create "Swiss cheese" holes in Inmarsat's service area!

[4] "Economic Impact of Terrestrial L-Band Services on Inmarsat and Its Users," *ex parte* presentation of Inmarsat, IB **Docket** No. 01-185, File No. **SAT-ASG-20010302-00017** *et al.* (filed November 27, 2002).

COMTEK implies that adding specific front-end filtering is not a desirable solution, but does not address the sheer impossibility of retrofitting the 250,000 Inmarsat mobile earth terminals already in operation.'

5. MSV-Self Interference.

COMTEK does not analyze the extent to which MSV's deployment of ATC would cause intra-system interference to MSV's satellite operations. This issue is glossed over in Section 7.3 of the COMTEK Report. COMTEK has referred to the MSV stated requirement of 10 dB isolation, without examining whether the acceptance of such a high level of intra-system interference, due to ATC interference alone, is feasible (COMTEK Report at 78). COMTEK has also based its derivation of the spectrum (sub-bands) available for ATC use in different parts of the satellite beams on ideal assumptions.

This issue is critical because it represents another aspect of the interference scenario that adversely impacts Inmarsat. As Inmarsat has demonstrated, self-interference from ATC causes MSV to consume more L-band spectrum than it otherwise needs.[6] That spectrum would not be available for Inmarsat to use for the expanding demand for MSS service. This self-interference problem is one of the many ways that ATC constrains the capacity of the Inmarsat system.

6. Monitoring **and** Control **of** Interference.

COMTEK does not assess how ATC interference into the Inmarsat spacecraft could be monitored and controlled. As Inmarsat has previously explained, this is a very important issue that requires a practical solution before ATC could be authorized.' The issues that Inmarsat has identified with monitoring and controlling ATC interference into the Inmarsat spacecraft*become even more complex in the case assumed by COMTEK where four separate ATC systems could operate in the L-band.

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[5] *Id.*

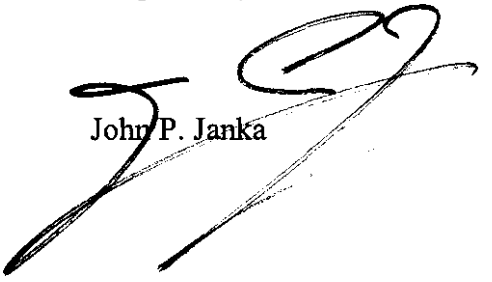
[6] "MSV is Unable to Operate ATC Without Using Additional Spectrum Beyond That Used for Its **MSS** System," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed May 21,2002).

[7] "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,"' ***ex parte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed May 15,2002).

[8] "Economic Impact of Terrestrial L-Band Services on Inmarsat and Its Users," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017***et al.*** (filed November 27, 2002); Letter from Inmarsat to Chief, Office of Engineering and Technology regarding terrestrial monitoring capabilities, dated November 26,2002, ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File **No.** SAT-ASG-20010302-00017***et al.*** (filed November 27,2002).

An original and five copies are enclosed.

Respectfully submitted,



John P. Janka

Enclosures

cc:

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Bruce Franca
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Breck Blalock
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Paul Locke
Trey Hanhury

Inmarsat Technical Analvses on ATC

1. ***Comments of Inmarsat Venturesplc,*** IB Docket No. 01-185 (filed October 19, 2001), and ***Technical Annex*** thereto

2. ***Reply Comments of Inmarsat Venturesplc,*** IB Docket No. 01-185 (filed November 13, 2001), and ***Supplemental Technical Annex*** thereto

3. ***Exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed February 26,2002)

4. ***Further Comments oflnmarsat Venturesplc,*** IB Docket No. 01-185 (filed March 22,2002)

5. "Quantification of Harmful Co-Channel L-Band Uplink Interference into Inmarsat-4 From MSV ATC Uses, Versus MSV Mobile Earth Terminal Uses," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed May 10,2002)

6. "Inmarsat Response to MSV Ex Parte of March 28 Concerning 'Monitoring and Control of Ancillary Terrestrial Emissions by MSV's Space Segment,"' ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed May 15,2002)

7. "MSV is Unable to Operate ATC Without Using Additional Spectrum Beyond That Used for Its MSS System," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed May 21,2002)

8. "Inmarsat's Reply to the 'Further Technical Analysis' of Mobile Satellite Ventures, dated July 29,2002," ***exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed September 9,2002)

9. ***Exparte*** presentation of Inmarsat, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed September 12,2002)

10. Ex *parte* presentation of Inmarsat to the Office of Engineering and Technology, IB Docket No. 01-185, File No. SAT-ASG-20010302-00017 ***et al.*** (filed November 6,2002)